

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 July 2002 (04.07.2002)

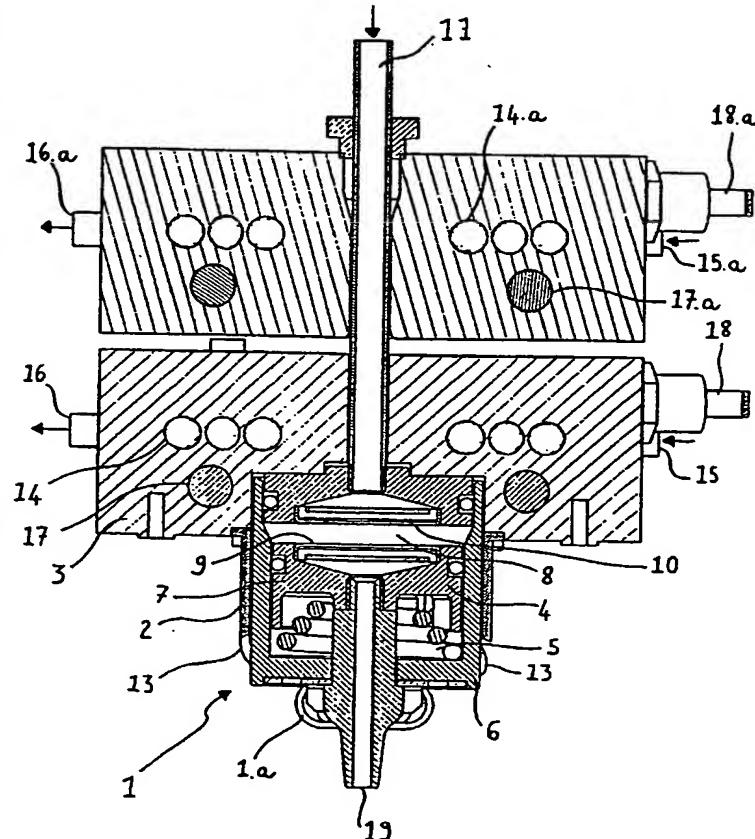
PCT

(10) International Publication Number
WO 02/051290 A1

- (51) International Patent Classification⁷: **A47J 31/06**, 31/44, 31/40
- (21) International Application Number: **PCT/IB01/02713**
- (22) International Filing Date:
24 December 2001 (24.12.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
AN2000A000054
27 December 2000 (27.12.2000) IT
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- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,

[Continued on next page]

(54) Title: CHARGER FILTER HOLDER FOR ESPRESSO COFFEE MACHINES



(57) Abstract: The invention refers to machines for the preparation of espresso coffee or similar beverages. A charger filter holder (1) is equipped with an elastically deformable element (5) designed to eject the block of used coffee grounds from the infusion chamber (8) after the infusion process. The charger (1) is attached by means of a bayonet fitting to the metal support sheath (2), which is maintained at a constant temperature by direct contact with the heat accumulator/exchanger (3) for the infusion water. The construction methods for the bayonet fitting reduce wear on the spiral guides (13) and make replacement of worn parts easier. The advantages are: easy ejection of the used block, constant temperature of the infusion chamber (8) and longer duration of the bayonet fitting.

WO 02/051290 A1



GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

Published:

— with international search report

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CHARGER FILTER HOLDER FOR ESPRESSO COFFEE MACHINES

DESCRIPTION

The subject of this invention is a charger filter holder for espresso coffee machines.

In the majority of espresso coffee machines currently produced, the boiler for the water is separate from the infusion chamber. This causes the organoleptic qualities of the coffee to deteriorate if the machine is not used continually, in fact the temperature of the water for infusion decreases along the piping from the boiler to the infusion chamber and in the infusion chamber itself, since these elements cool down when the machine is not used continually.

The Patent deposited on 21.11.1985 at the UPICA in Pesaro, application number 1244, offers a solution to this setback using a distributor of espresso coffee in which the boiler and the charger are incorporated in a single, heated unit. Consequently, the infusion chamber and the connecting pipe always remain hot.

The method given in this document, designed specifically for automatic machines, cannot easily be used on machines equipped with a manual charger, with external handle and a bayonet fitting or a similar fitting. As is known, in espresso coffee machines, whether domestic or for bars, the ground coffee is placed in a charger-filter holder which is then fixed to the machine using a fitting which is generally of a bayonet type: the charger is fitted using an external handle on the charger itself and firmly locked onto the machine using a twisting movement.

Said charger acts as the infusion chamber for the ground coffee when it is flooded with the hot water.

Known chargers generally have a fixed volume infusion chamber, that is they do not expand during the infusion process, when the ground coffee is saturated by the pressurised

hot water. This fact causes one major shortcoming: the ground coffee contained in the charger is not fully utilized. It has been noted that, if said ground coffee has the opportunity to expand and move around in the charger when the hot water flows through, it is possible to obtain a stronger infusion with improved organoleptic qualities.

5 This matter is sufficiently considered in the Italian Patent N° 01265639 which also offers the following solution: above the infusion chamber is a sliding filter holder, pressed against said infusion chamber and therefore against the powdered coffee, by a spring; the sliding filter holder and the relative spring are fitted inside the heat exchanger which heats the water for infusion in order to keep these components hot at all times. As is fully explained in the above-mentioned document, the hot water is injected into the infusion chamber under strong pressure by a pump, causing the sliding filter to lift and therefore increasing the volume in the infusion chamber; consequently all the particles of ground coffee are free to move around and blend or, if contained in wafers or cartridges, can be easily reached by the flow of hot water allowing the full flavour to be extracted; when the water is turned off, the sliding filter holder, 10 pushed by the relative spring, again presses down on the ground coffee, compressing and drying it and reducing it to a semi-solid block.

15

The invention claimed in the above-mentioned document, to which the reader is referred for functional detail not described in the present document inasmuch as they are the patrimony of the known process, was a considerable improvement on the state of the art at the time. However one setback remains, since the block of ground coffee remaining after infusion frequently sticks to the inside of the charger and there are practical difficulties in extracting it.

A further setback present in the above-mentioned document, as can easily be noted in the drawings enclosed with it, is that there are evident, intrinsic, constructional limits to the invention proposed, the spiral guides of the bayonet fitting must consist of channels cut into 20 the body of the charger itself; said channels cannot be very deep, unless the charger is made exceptionally thick; nor can the channels be cut into the body of the heat-exchanger which surrounds the charger, since the heat exchanger is made of soft metal, generally aluminium. Consequently, the guides on the bayonet attachment are subject to rapid wear, above all the progressive distortion of the rectangular section of the channels, and the charger must be 25 replaced frequently.

The first aim of the present invention is to construct an espresso coffee machine, equipped with a traditional type of fast-fitting charger, which, while preserving the advantages of the previous patents, will allow the block of compressed grounds to be ejected easily after infusion.

5 Another aim of the present invention is to construct an espresso coffee machine in which the spiral guides of the bayonet fittings of the charger will not be subject to wear.

These and other scopes will be attained by an espresso coffee machine equipped with a manual filter holder charger with bayonet fitting having the characteristics described in this document and in the enclosed claims which are an integral part of the description.

10 Said characteristics will be better explained by the following description of a preferred form of the construction, which is representative and not limiting, and is illustrated in the enclosed drawings in which:

- figure 1 shows a frontal section of a ground coffee charger;
 - figure 2 shows an axonometric view of the charger and the boilers for the water and
- 15 the steam.

With reference to the above drawings, number 1 indicates a charger fitted with an external handle 1a.

As shown in the drawings, said charger 1 can be fixed to an espresso coffee machine using a bayonet fitting consisting of a spiral guide 13 into which the pins 12 fasten; the spiral 20 guides 13 are made from the entire thickness of a metal support sheath 2 which in turn is fitted and thermally connected to a heat- accumulator/exchanger 3 for heating the water for infusion; the pins 12 are removable, for example by unscrewing, to the charger 1 and may be made in softer material than the support sheath 2 or at least that part of the metal support sheath in which the spiral guides 13 are cut.

25 With 3a is indicated a heat accumulator/exchanger for producing steam.

Both the accumulator/exchangers 3 and 3a are in compact metal, for example aluminium; inside them are serpentines 14 and 14a destined to carry respectively, water to be heated for infusion or to be transformed into steam and there are also serpentines 17 and 17a consisting of electric resistances for heating the accumulator/exchangers 3 and 3a. With 15 and 15a are 30 indicated respectively the entrance extremities of the serpentines 14 and 14a and with 16 and 16a are indicated respectively the termination of the serpentines 14 and 14a; with 18 and 18a

are indicated the electric connections of the serpentines 17 and 17a. The construction methods of said accumulator/exchangers 3 and 3a are a known technique.

Inside the charger 1 is a compression element 4. An elastically deformable element 5 is interposed between the compression element 4 and the base 6 of said charger.

5 In the position shown in the drawing, an infusion chamber 8 destined to contain the coffee grounds, is positioned between the compression element 4 and the upper filter holder 7.

The compression element contains a lower filter 9 while the upper filter holder 7 contains an upper filter 10.

10 The infusion chamber is delimited by said two filters, respectively upper and lower 9 and 10, and the internal surface of the charger 1.

A conduit 11 for admitting hot water into the infusion chamber 8 is linked, by piping not shown in the drawings, to the terminal extremity 16 of the serpentine 14. The nozzle 19 from which the infusion issues is shown.

15 The functioning of the subject of the present invention is now described, with reference to the parts in the drawings.

After filling the infusion chamber 8 with ground coffee, the charger 1 is fitted into the metal support sheath 2 by means of the spiral guides 13 and the corresponding pins 12 and, by twisting the external handle 1a, it is firmly fixed to said sheath 2.

Said fitting of the charger 1 causes the ground coffee to be compressed between the lower 20 filter 9 and the upper filter 10 and, at the same time causes slight compression of the elastically deformable element 5.

When the charger is fully fitted, said elastically deformable element continues to exercise pressure on the coffee grounds in the infusion chamber 8.

At this point the infusion begins, by allowing the hot water for infusion to flow into the infusion chamber 8, through the conduit 11, typically at the temperature of 90°C and under very high pressure; during the infusion process, the elasticity of the elastically deformable element 5 allows the compression element 4 to be lowered, due to the pressure of the water and the consequent increase in volume of the infusion chamber 8, which, as already stated in the above-mentioned Italian Patent N° 01265639 allows the optimal use of the ground coffee 30 loaded in the charger.

As the hot water is injected, the infusion issues from the nozzle 19. When the pressurised water stops, the compression element 4, pushed by the elastically deformable element 5, presses the grounds or the wafer of coffee forming a semi-solid, compressed and almost dry block.

- 5 When infusion is concluded it is possible to release the charger 1 from the relative spiral fitting 2 using the handle 1a.

At this point the elastically deformable element 5 is no longer compressed and can return to its natural extended position, releasing and partially ejecting the block of used coffee from the infusion chamber 8.

- 10 Since the metal support sheath 2 is fixed and thermally connected to the heat accumulator/exchanger 3, and the charger 1 is fitted into the metal support sheath 2 as usual, the infusion chamber 8 is held at a temperature substantially equal to the ideal temperature for infusion, guaranteeing the organoleptic qualities of the resulting infusion.

- 15 Since the spiral guides 13 are cut into the entire depth of the metal support sheath 2 they are subject to less wear than those made according to the known technique and in any case the wear on the edges of said guides does not substantially change the profile, guaranteeing a good seal for a reasonably long time; also, if as already stated the pins 12 are made of softer material than the metal support sheath 2, the latter being easily and economically replaceable, can be sacrificed and act as protection against the wear of the spiral guides 13. Also, at least 20 for machines destined for heavy use, such as those in public places, it would be possible to sell pins 12 of various diameters (obviously this means variations of tenths and hundredths of mm) in order to compensate, by replacing the pins 12 for the slight wear on the edges of the spiral guides 13, recovering the play which has formed over time.

- 25 The first advantage offered by the subject of the present invention is the ease of ejection of the blocks of ground coffee which are automatically removed from the infusion chamber.

A second advantage is that it is possible to guarantee the duration of the bayonet fixing, comprising the spiral guides 13 and the pins 12.

A third advantage is the fact that the inevitable wear on the bayonet fixing can be rapidly and economically repaired by replacing the pins 12.

- 30 Said advantages are easily attained by adopting the methods in the present document, while preserving all the advantages of the previously described known technique.

This description mentions ground coffee to be placed in the infusion chamber, but it is obvious that the charger described in the present document can be advantageously used with coffee wafers or coffee grounds packaged in rigid plastic cartridges, just as more generally, the method can be used for infusion machines for any type of beverage.

5 The enclosed drawings show a charger 1 suitable for receiving either coffee or another substance for infusion, either in the form of a loose powder or in a wafer while, if one of the plastic cartridges available on the market is to be used, the shape of the infusion chamber 8 can be changed to create a suitable fitting. It is then evident that, without the need for detailed descriptions or illustrative drawings, it is possible to design a charger 1 which, with suitable
10 interchangeable, internal adaptors, can be used either for coffee or for other powdered substances, wafers or rigid cartridges.

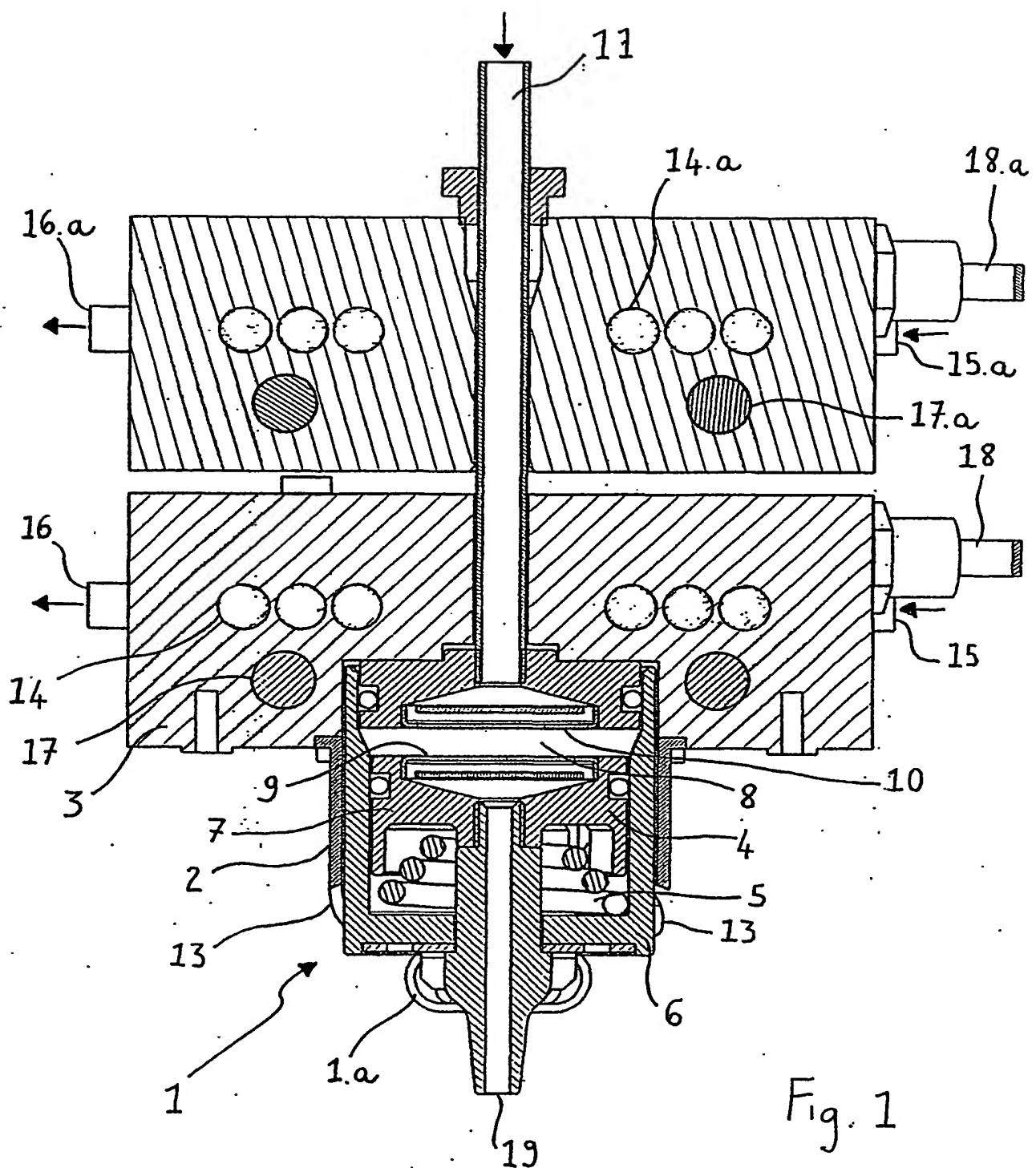
Finally, it should be noted that the heat accumulator/exchanger 3a for producing steam is foreseen in the enclosed drawings, above and close to the heat accumulator/exchanger 3 while, as far as is known, the known technique always positions these elements side-by-side.

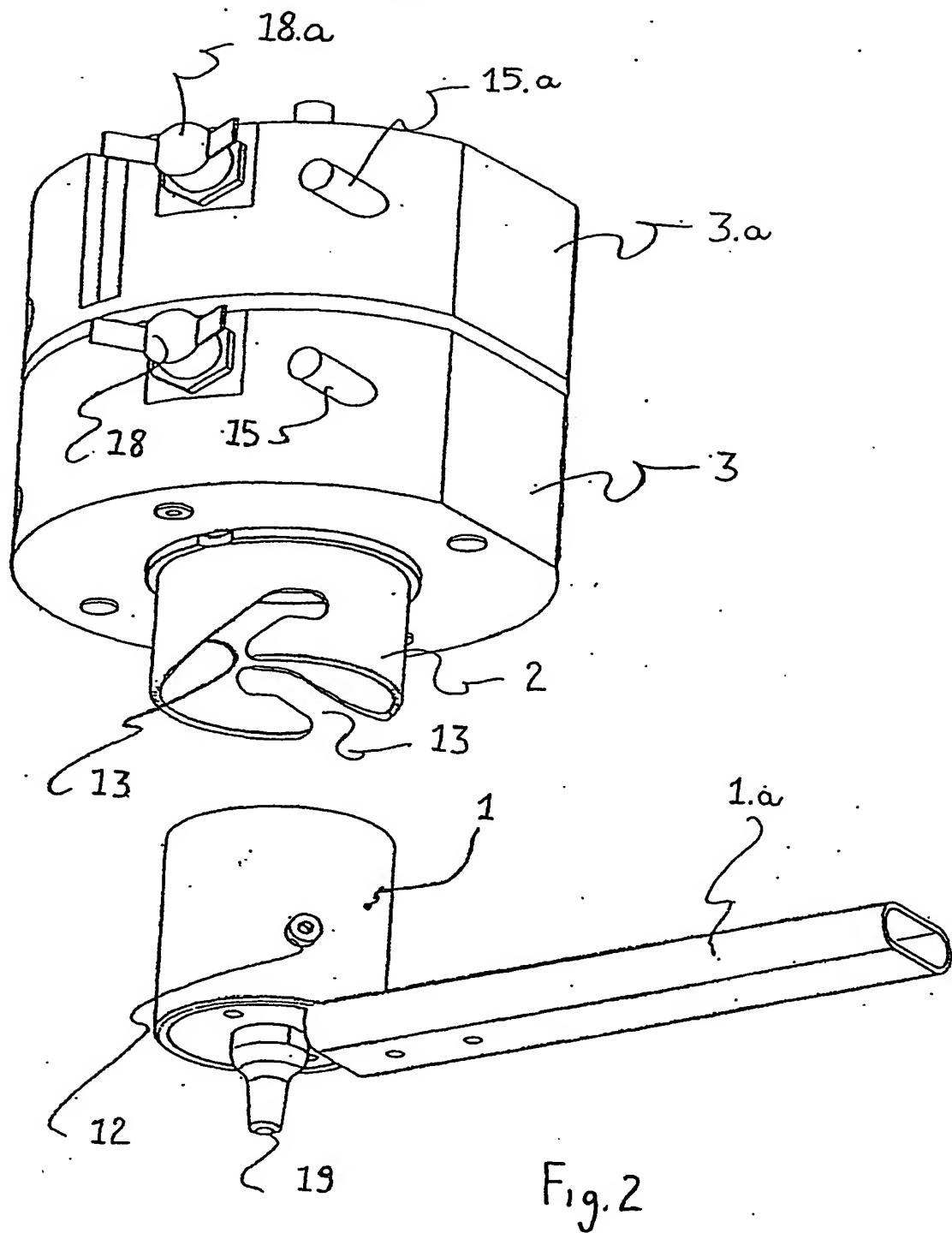
15 It is evident that the position proposed here, by reducing the exposed surfaces, reduces the dispersion of heat due to convection currents.

CLAIMS

1. Machine for obtaining infusions of coffee or substances which can be treated in a similar manner, equipped with a charger (1) which can be fitted to the machine by means of suitable fittings and also equipped with removable elements
 - designed to move in order to increase the volume of the infusion chamber (8) during the injection of pressurised hot water;
 - and designed to return to the previous position after the pressurised hot water has been injected, so as to compress the above-mentioned substance subjected to infusion, if loaded in the form of a loose powder or a wafer, into a semisolid block, characterised by the fact that
- 5 10 said mobile elements comprise an elastically deformable element (5) fitted inside the said charger (1).
2. Machine for obtaining infusions as at claim 1, characterised by the fact that said elastically deformable element (5), once released from the charger (1), on conclusion 15 of the process of infusion, can further extend sufficiently to cause the release of the block which has formed in the infusion chamber (8).
- 15 20 3. Machine for obtaining infusions as at any of the previous claims, characterised by the fact that said elastically deformable element (5), is positioned between the compression element (4) and the base (6) of the charger (1).
4. Machine for obtaining infusions as at any of the previous claims, characterised by the fact that filters (9, 10) are foreseen which press against the substance from which the infusion is to be obtained.
- 25 5. Machine for obtaining infusions as at any of the previous claims, characterised by the fact that the charger (1) is fixed to the machine for obtaining infusions in correspondence with the metal support sheath (2) which is in turn in contact with the heat accumulator/exchanger (3) said thermal contact being sufficient to maintain the infusion chamber (8) at a 30 temperature substantially similar to that required for the infusion process.

6. Machine for obtaining infusions as at any of the previous claims,
characterised by the fact that
the charger (1) fits into said metal support sheath (2).
7. Machine for obtaining infusions as at any of the previous claims,
5 characterised by the fact that
the charger (1) is of the type equipped with a handle (1a) and which fits onto the machine
by means of a bayonet fitting comprising spiral guides (13) and pins (12), said spiral
guides (13) being cut into the entire thickness of said metal support sheath (2) and said
pins (12) being fixed to the body of said charger (1).
- 10 8. Machine for obtaining infusions as at any of the previous claims,
characterised by the fact that
said pins (12) are fitted in such a way as to be easily removable and replaceable.
9. Machine for obtaining infusions as at any of the previous claims,
characterised by the fact that
15 said pins (12) are made of a softer material than the metal support sheath in which the
spiral guides (13) are cut.
10. Machine for obtaining infusions as claims 8 and 9,
characterised by the fact that
said pins (12) would be available as spare parts in various diameters, in order to recover
20 the play caused by progressive wear on the edges of the spiral guides (13) on the bayonet
attachment.
11. Machine for obtaining infusions as at any of the previous claims,
characterised by the fact that
the heat accumulator/exchanger (3a) for production of steam is fitted above and close to
25 the heat accumulator/exchanger (3).





INTERNATIONAL SEARCH REPORT

Serial Application No

PCT/IB 01/02713

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A47J31/06 A47J31/44 A47J31/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y		5,7,8
A	column 1, line 22 - line 36 column 3, line 16 - line 22 column 3, line 39 - line 44 figures 1-3	2
X	EP 0 450 200 A (MACH A CAFE S A) 9 October 1991 (1991-10-09) column 3, line 34 -column 4, line 10 figures 1-3	1,2
X	DE 299 17 586 U (EUGSTER FRISMAG AG ROMANSHORN) 5 January 2000 (2000-01-05) page 6, line 5 -page 7, line 35 figure 1	1
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 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
24 April 2002	07/05/2002

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

International Application No

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